UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ARTHUR SHEIMAN, SAIMANOHORA ALAPATI,
WILLIAM TISO, and LOUIS FRANCZ

Appeal 2007-0333
Application 09/966,802
Technology Center 2100

Decided: February 27, 2007

Before ALLEN R. MACDONALD, JEAN R. HOMERE, and
JAY P. LUCAS, *Administrative Patent Judges*.

MACDONALD, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1, 7, 13, and 19-22. Claims 2, 4-6, 8, 10-12, 14, 16-18, 23-27, and 30-33 have been indicated as containing allowable subject matter (Br. 2). We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

INTRODUCTION

The claims are directed to varying a filter that processes an audio signal without introducing audible artifacts. Specifically, the filter is engaged or disengaged gradually by changing the filter's coefficients. Claim 1 is illustrative:

1. A method of time varying filtering, comprising:

a. filtering a segment of a signal using a filter; and

b. disengaging the filter in a sequence of graduated steps at the end of the segment; and

c. repeating steps a and b until all segments have been filtered.

The Examiner relies on the following prior art reference to show unpatentability:

Sakata	US 5,140,541	Aug. 18, 1992

The rejection as presented by the Examiner is as follows:

Claims 1, 7, 13, and 19-22 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sakata.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Briefs and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004).

OPINION

It is our view, after consideration of the record before us, that the disclosure of Sakata fully meets the invention as set forth in the claims on appeal. Accordingly, we affirm.

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. *RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984); *W.L. Gore and Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983).

The Examiner has indicated how the claimed invention is deemed to be fully met by the disclosure of Sakata (Answer 3-4). Regarding claims 1 and 19, Appellants argue that Sakata does not disengage a filter at the end of the signal segment as claimed. Rather, Appellants contend that Sakata merely changes the cutoff frequency of a single filter, but never disengages the filter (i.e., neutralizes the filter or renders the filter ineffective). According to Appellants, Sakata's filter remains operational despite cutoff frequency changes (Br. 3-5; Reply Br. 2-3).

Appellants further argue that Sakata does not engage a filter at the beginning of a signal segment as claimed in claims 7 and 20. Appellants contend that merely changing cutoff frequency in Sakata does not engage the filter (i.e., change the filter from a neutralized or ineffective state) (Br. 5-6; Reply Br. 4-5). Appellants also argue with respect to claims 13 and 21 that

Sakata does not disclose both engaging and disengaging the filter as claimed (Br. 6-7; Reply Br. 5-6).

The Examiner argues that Sakata's filter functions as (1) a "first filter" at a first cutoff frequency, and (2) a "second filter" at a second cutoff frequency. With this interpretation, the Examiner argues that Sakata's first filter is disengaged (and the second filter is engaged) when the cutoff frequency changes from the first to the second cutoff frequency. The Examiner further notes that the first filter is disengaged at the end of the segment corresponding to the sequence of signal samples at the cutoff frequency transition (Answer 5).

We will sustain the Examiner's rejection of claims 1, 7, 13, and 19-21. We agree with the Examiner that changing a digital filter's cutoff frequency using Sakata's technique effectively (1) "disengages" the filter at the first cutoff frequency, and (2) "engages" the filter at the second cutoff frequency giving the disputed terms their broadest reasonable interpretation. A filter processes a signal uniquely in a manner dictated by filter's cutoff frequency (or frequencies). In short, Sakata's digital filter uniquely processes a signal in accordance with a specific cutoff frequency; such unique signal processing dictated by the cutoff frequency effectively establishes a unique "filter" at different cutoff frequencies. In our view, Sakata's changing the digital filter's cutoff frequency effectively "disengages" and "engages" different filters respectively.

Even if we adopt Appellant's construction of "disengaging" and "engaging" respectively,"[1] our conclusion holds. For example, a low pass filter whose cutoff frequency is increased from a lower to a higher frequency effectively renders the low pass filter with the first, lower cutoff frequency ineffective. Prior to changing the cutoff frequency, the low pass filter at the first cutoff frequency passes signals with frequencies lower than the cutoff frequency. Signals higher than the first, lower cutoff frequency are attenuated. After raising the cutoff frequency using Sakata's technique, the low-pass filter will now pass frequencies higher than the first, lower cutoff frequency. By allowing more frequencies to pass, the low pass filter with the second, higher cutoff frequency effectively *supplants* the low pass filter with the first, lower cutoff frequency. Simply put, the low pass filter with the first, lower cutoff frequency is rendered ineffective (i.e., "disengaged") for all practical purposes. Likewise, the low pass filter with the second, higher cutoff frequency is "engaged" for all practical purposes.

We also agree with the Examiner that Sakata (1) disengages the filter at the end of the signal segment, and (2) engages the filter at the beginning of the signal segment essentially for the reasons stated by the Examiner. Significantly, the claims do not specify the exact contours or bounds of what constitutes a signal segment apart from broadly reciting "a segment of a signal." Accordingly, the Examiner's interpretation of such a segment as corresponding to those signal samples present when the filter with the first

[1] Appellants define "disengaging" as "changing a filter to a neutralized or ineffective state" (Br. 4), and "engaging" as "changing a filter from a neutralized or ineffective state" (Br. 5).

cutoff frequency is disengaged and second cutoff frequency is engaged is reasonable given the scope and breadth of the claim language.

For at least the above reasons, we will sustain the Examiner's rejection of claims 1, 7, 13, and 19-21.

Regarding claim 22, Appellants argue that Sakata does not disclose inaudibly switching one or more filters on and/or off as claimed (Br. 7-8). The Examiner responds that Sakata teaches an interpolation technique to avoid noise. Such a teaching, according to the Examiner, implies inaudibly switching (Answer 5). Appellants respond that the Examiner merely referred to a noise problem in the prior art, and that Sakata's solution could avoid noise, yet still be audible (Reply Br. 6).

We will sustain the Examiner's rejection of claim 22. At the outset, we note that the limitation calling for "inaudibly switching one or more filters on and/or off during processing of an input signal" is merely a desired result of the recited coefficient migration step. That is, the term "by" in line 3 of the claim indicates that inaudibly switching the at least one filter is merely intended to occur as a result of coefficient migration.

With this construction, we turn to Sakata. We first note that Appellants do not dispute the Examiner's interpretation of Sakata regarding the coefficient migration step in lines 4 and 5 of the claim – an interpretation that we find reasonable. Accordingly, the issue before us is whether Sakata's coefficient migration is capable of performing the intended result, namely inaudibly switching one or more filters on and/or off during processing of an input signal. For the following reasons, we conclude that Sakata's is capable of performing this intended result.

First, Sakata's coefficient migration is capable of switching at least one filter on and off. Our discussion of Sakata's ability to disengage and engage respective filters via changing cutoff frequency applies equally here and we incorporate that discussion by reference.[2]

Second, Sakata's engaging and disengaging filters is, in our view, capable of being inaudible. As Sakata indicates, noise results from instantly changing filter coefficients from one cutoff frequency to another (Sakata, col. 1, ll. 33-40). Sakata then describes a previously-known filter coefficient interpolation technique designed to avoid noise, but which produced excessive deviations from the desired filter coefficient values. These deviations ultimately produced unnaturally-sounding transient tones (Sakata, col. 1, ll. 41-58). Sakata's digital filter, however, smoothly changes the cutoff frequency while substantially maintaining filter characteristics in a region near the cutoff frequency -- even in response to large changes in cutoff frequency (Sakata, col. 2, ll. 27-33). To this end, Sakata gradually changes the goal value of cutoff frequency and interpolates corresponding filter coefficients at each goal value (Sakata, col. 2, l. 65 – col. 3, l. 5; col. 4, l. 51 – col. 5, l. 8).

The clear import of this discussion is that Sakata's filter is designed to prevent such problems in prior art filters, namely to avoid noise and transient tones when filter coefficients are changed. Given this designed capability of Sakata's filter, we conclude Sakata's filter is capable of switching inaudibly as claimed given the scope and breadth of the limitation. Significantly, the term "inaudibly" is extremely broad and somewhat subjective. Given the

[2] *See* P. 4-6, *supra*, of this opinion.

scope and breadth of the term, we conclude that Sakata's filter is capable of inaudibly switching a filter as claimed – at least to some persons.

For at least the above reasons, we will sustain the Examiner's rejection of claim 22.

DECISION

In summary, we have sustained the Examiner's rejection with respect to all claims on appeal. Therefore, the Examiner's rejection of claims 1, 7, 13, and 19-22 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2004).

AFFIRMED

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